WA 2302 2b

8/1/1986

WASTE ANALYSIS PLAN

WAC 173-303-300 (4) and (5)

Monsanto Chemical Company
Seattle Plant

August 1986

Note: The analytical procedures noted in this Waste Analysis Plan may change with time as new or more appropriate methods are developed. Monsanto reserves the right to modify its procedures accordingly.

obtained at 3/31/88
RCRA inspection
J. Parkani

CONTENTS

TABLES

FIGURE

APPENDIX

WASTE ANALYSIS PLAN

1 INTRODUCTION

The Waste Analysis Plan described in this section presents sampling and analysis procedures for wastes generated at Monsanto Chemical Company's Seattle plant, such that it can be determined if these wastes have changed materially from their original and periodic characterization(s). The plan is also designed to provide sufficient information to allow for proper handling and onsite management of waste and for determining appropriate disposal methods at offsite hazardous waste treatment, storage, or disposal (TSD) facilities. It should also be noted that a product, Vanillin Still Bottoms (VSB), is stored adjacent to Monsanto's RCRA interim status storage facility.

The following plan calls for periodic physical and chemical analyses of waste streams for which Monsanto holds a RCRA Part A permit to assess if the waste(s) are similar from sample to sample and that Monsanto's onsite waste management activities are still appropriate. This section describes the waste streams and the prescribed waste sampling methods and analytical parameters. To the best of Monsanto's knowledge, no ignitable or reactive wastes are managed at the storage facility.

2 HAZARDOUS WASTE STREAMS

WAC 173-303-300(4)

Hazardous waste streams from the plant are mainly byproducts of vanillin production and laboratory and maintenance operations. Table 1 shows each potentially hazardous waste stream, its RCRA classification, WDOE designation (if known), and an estimate of the maximum annual volume produced.

The Waste Analysis Plan covers only those wastes that will be managed or stored in the storage tank (S02) or in containers (S01) (i.e., drums) at the RCRA interim status permitted storage facility. These waste streams as well as other waste streams that Monsanto routinely or periodically generates and that are managed in accordance with 40 CFR 262 and WAC 173-303-170, Standards Applicable to Generators of Hazardous Waste, are indicated in Table 1. All of the drummed wastes are compatible with each other based on information in the EPA document A Method for Determining the Compatibility of Hazardous Waste (April 1980, EPA-600/2-80-076). Further discussion of compatibility information is located in Appendix A.

Table 1

RCRA AND WDOE HAZARDOUS WASTES GENERATED AT MONSANTO CHEMICAL COMPANY'S SEATTLE PLANT

Waste	EPA/WDOE[a] Waste Code	WDOE Designation	Estimated Maximum Annual Quantity	May be Managed at Storage Facility
Strainer Solids	D002[b]	DW	1,000 tons average batch = 1,500 lbs	YES
Used Peneteck Oil Residue	WT02	DW	120 drums	YES
Vanillin Black Liquor Solids (VBLS)	D002	DW	6,000 tons	NO
Waste Solvents (Kingsolv)	WT02	DW	1/2 drum	YES[c]
Methylene Chloride	F001	DW	1/2 drum	YES[c]
Potential hazardous wastes resulting from emergency conditions	case-by-case determination	case-by-case determination		YES

[a] The RCRA Part A interim status permit also shows wastes D003 and U220 as potentially being stored in this area. When the permit application was submitted it was anticipated that U220 and D003 waste might be generated; however, they never have been. The U220 waste is now cycled back to the process.

[b] Has been managed as D002, even though actual tests show pH=11.4 rather than greater than 12.5. Monsanto reserves the right to classify this material as hazardous (RCRA and WDOE) if, in fact, it is not.

[c] Managed under generator status only.

2.1 CONSTITUENTS AND PROPERTIES OF WASTE STREAMS STORED ONSITE

The following sections present data on the hazardous constituents and chemical and physical properties of each potentially hazardous waste generated at the Seattle plant and stored onsite at the permitted storage facility (WAC 173-303-300(2)).

The waste properties were obtained using historical information and data, and current analytical data. In some cases, the historical methods used to obtain historical data may not be identical to the current EPA or WDOE conventions.

Strainer Solids

Monsanto has managed strainer solids as a dangerous waste even though data indicate that it is not a dangerous waste. It is being managed as a dangerous waste because the solids are filtered out of an aqueous process liquid with a pH greater than 12.5. The liquid is a liquor from an alkaline caustic soda process. The strainer solids consist mainly of calcium and sodium salts that are similar in texture to a sandy soil. Table 2 shows the results of analyses that have been run on these solids.

Table 2
ANALYSES OF STRAINER SOLIDS

Date of Analysis	EP Toxicity (mg/l) As	Ba	Cd	Cr	Pb	Hg	Se	Ag	PAH (%)	pH
12-8-80	<1.0	<10.0	<0.03	<0.05	<0.40	<0.0002	<0.02	<0.04		
4-17-86									<0.475[a]	
6-18-86										11.4

[a]The actual PAH percentage is believed to be much lower than this, but the analytical procedure required by WDOE does not call for further testing once the one percent level has been reached.

Used Peneteck Oil Residue

Used Peneteck oil residue results from clarifying mineral oil. The oil is recycled and the residues are containerized for onsite shipment to a hazardous waste TSD facility. Table 3 shows the results of analyses that have been run on this material.

2.2 WASTE ANALYSIS PLAN IN RELATIONSHIP TO GENERATOR ACTIVITIES

This waste analysis plan does not detail the specific procedures for routine testing and analysis of wastes that Monsanto currently manages in accordance with 40 CFR Part 262 and WAC 173-303-170; that is, those not stored longer than 90 days.

Table 3
ANALYSES OF USED PENETECK OIL RESIDUE

Date of Analysis	Analysis Performed							
	EP Toxicity (mg/l)							
	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
7-29-83	<0.01	<1.0	<0.03	<0.1	<0.2	<0.003	<0.005	<0.05
7-29-83	Fish Bioassay							
	Concentration (mg/l)			Deaths/ Total Fish Exposed				
	1,000			30/30				
	100			0/30				
4-23-85	Flash Point of Used Peneteck oil (prior to clarification)							
	282°F ASTM Method D3828							
5-19-86	PAH of Used Peneteck oil (prior to clarification)							
	0.257 percent							

2.3 WASTE ANALYSIS PLAN IN RELATIONSHIP TO FACILITY CLOSURE

General sampling, analysis, and laboratory quality assurance procedures for the waste stored at the storage facility are addressed in this waste analysis plan. Where regulated waste management unit closure activities require specialized procedures (e.g., sampling and analytical methods, decontamination techniques, etc.), they are addressed more specifically in the Closure Plan.

3 WASTE ANALYSIS PARAMETERS

WAC 173-303-300(4) AND (5)(a)

3.1 RATIONALE FOR WASTE ANALYSIS PARAMETERS

Chemical and physical analyses are periodically performed on the waste generated at the Seattle plant to determine regulated waste designation codes, appropriate storage methods and types of containers, waste compatibility with other wastes and method(s) of storage, to confirm that the waste is similar to previous characterizations, and to determine appropriate offsite treatment, disposal, or reclamation methods. The following analyses are performed, as specified for each waste in Table 4 to test for hazard designation:

- pH is determined on the strainer solids because they are filtered from an aqueous process liquid that has a pH greater than 12.5.

- EP Toxicity for metals is determined for the strainer solids due to possible fluctuations in the metal content of the raw materials (i.e., waste sulfite pulp liquor).

- Aquatic toxicity will be run on the strainer solids because even though it may pass the corrosivity and EP Toxicity, it may not pass this test.

- Aquatic toxicity is run on the used Peneteck oil residue because this is the test that has caused this waste to be classified as a DW.

- Based on a knowledge of lignin chemistry, the raw materials used and process conditions, no PAHs are expected. Strainer solids are derived from a process of an oxidative reaction of lignin-containing material. Used Peneteck oil residue results from the distillation of mineral oil from vanillin. PAHs are not expected because none are present in the raw materials used and because no process conditions exist which would be conducive to their formation (high temperatures or pressures). However, because there is a lignin-containing raw material, the conservative approach will be taken and PAH will be determined for these two wastes.

- Ignitability is determined for the used Peneteck oil residue because it is derived from mineral oil.

- o EP toxicity for metals is determined for the used Peneteck oil residue because of the potential for metals accumulation in the oil and clarification residues.

Table 4
CHEMICAL AND PHYSICAL ANALYSIS REQUIRED FOR EACH REGULATED WASTE STREAM STORED OVER 90 DAYS

Waste	Frequency	Chemical and Physical Analysis
Strainer Solids	Quarterly	pH (corrosivity)
	Annually	EP Toxicity for metals
	Annually	Aquatic Toxicity
	Annually	PAH
Used Peneteck Oil Residue (mineral oil bottoms)	Annually	EP Toxicity for metals
	Annually	Aquatic Toxicity
	Annually	PAH
	Annually	Ignitability

Other wastes such as used solvents and waste methylene chloride are stored in accordance with generator standards and are tested where necessary for their management.

The Seattle plant has been operating for 35 years with the last major change in the Vanillin manufacturing process occurring about 25 years ago. As such, Monsanto has more than three decades of experience generating and handling these process wastes. It has been Monsanto's experience that the waste streams exhibit very little variability over time. Consequently, Monsanto cannot foresee any circumstance that

would necessitate a change or modification in the way these wastes are managed in the onsite waste storage facility. However unlikely, if Monsanto significantly changed the process which generates one of the wastes, the waste analysis shall be repeated (WAC 173-303-300(4)).

3.2 CHEMICAL AND PHYSICAL ANALYSES FREQUENCY WAC 173-303-300(5)(d)

Chemical and physical analyses are performed on samples to check for changes in the waste stream that may affect methods of onsite storage, treatability and/or waste classification. The frequency of routine chemical and physical analyses and the waste streams analyzed are shown in Table 4.

4 ANALYTICAL METHODS WAC 173-303-300(5)(b)

Table 5 lists the analytical methods for each parameter. These methods or equivalent methods will be used for all analyses done by Monsanto's plant laboratory or an offsite commercial laboratory. The only testing from Table 5 that Monsanto presently conducts in the plant laboratory is for pH (corrosivity).

Table 5
REGULATED WASTE ANALYSIS TEST METHODS

Parameter	Method[a]
pH	Corrosivity Test[b]
Aquatic (fish) LC_{50} Toxicity	Static acute fish toxicity test[c]
Metals--extractable (EP Toxicity Extraction)	SW-846-1310[b,d]
Polycyclic Aromatic Hydrocarbons (PAH)	PAH test[b]

References:

[a] Type of container and preservative used for samples will be as specified in the appropriate method.

[b] Chemical Testing Methods for Complying with the Dangerous Waste Regulation, State of Washington, March 1982 revised July 1983, including addendum "Test Method for Determining pH of Solutions in Contact with Solids" of March 1984.

[c] Biological Testing Methods, DOE 80-12, revised July 1981.

[d] Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, SW-846, second edition (1982) as amended by update 1 (April 1984) and update 2 (April 1985).

4.1 SAMPLING METHODS

WAC 173-303-300(5)(c)

In order to ensure representative sampling, the procedures described in Table 6 should be followed for each waste to be sampled.

Table 6
WASTE SAMPLING PROCEDURES

Waste	Sampling Protocol[a]
Strainer Solids	ASTM D420-69 or Trier (SW-846, 1.2.1.5) or Thief (SW-846, 1.2.1.4)
Used Peneteck Oil Residue	ASTM D140-70

[a]Specified in WAC 173-303-110(2).

5. LABORATORY QUALITY ASSURANCE

The Monsanto laboratory has participated in the Proficiency Environmental Testing Program quarterly since 1984. Appendix B gives the guidelines for this program. The program helps assure the quality of the analyses done by the inhouse laboratory. The pH testing done in the Monsanto laboratory is part of this program.

5.1 QUALITY ASSURANCE POLICY

It is the policy of the Monsanto laboratory that all personnel shall adhere to the principles of good laboratory practice.

Calibration of pH Meter. All pH meters are checked and calibrated with pH Reference Buffer Solutions (traceable to National Bureau of Standards) prior to use for pH monitoring of samples.

Cleaning Requirements. Clean glassware and nonglassware, such as polyethylene, polypropylene, and Teflon ware, is an essential part of laboratory operations and a vital element of a quality assurance program. Attention to the cleanliness of these items must increase in proportion to the importance of the test, the required accuracy of the measurements, and the decrease in the analyses to be determined. In general, glassware is considered to be clean when it maintains a continuous film of distilled water over its entire inner surface.

Sampling Procedures. Specific sampling procedures shall be employed to collect representative waste samples. Shown previously, Table 6 lists the samples to be obtained and the sampling method.

Sample labels are necessary to prevent misidentification of samples. Gummed paper labels or tags are adequate and should include at least the following information:

- Sample number
- Name of collector
- Date and time of collection
- Place of collection

Labels should be affixed to sample containers prior to or at the time of sampling. The labels should be filled out at the time of collection.

Proper clothing and protective equipment should be worn at all times when sampling various waste materials.

5.2 CHAIN-OF-CUSTODY PROCEDURES

Chain-of-custody can be defined as the recorded history of the safekeeping of a sample from the sampling to final disposition; the ability to trace the whereabouts of a sample throughout the sampling and analytical program.

Sampling. Once a sample is taken, a label is affixed to the sample container. This label is the link between field and laboratory and should include information that is pertinent to the analyst. This information should include date, time, location/area, nature of sample, and name of person collecting the sample.

Transport. This will include length of time the sample is in transit and the condition of the sample upon arrival. The notations should be included in the analytical request sheet.

Monsanto Laboratory Analysis, Sample Receipt. Upon arrival to the laboratory, a log number is assigned to the sample. Pertinent information should be entered into the log book and a special analyses request is filled out. Copy of the analysis request stays with the sample throughout the analysis scheme. When the analysis is complete, all analytical data should be entered into the request sheet together with any additional reports pertinent to this special request. Copy of the analysis request then goes back to the requester and to the laboratory filing system. The final disposition of the sample should be noted on the request sheet.

Outside Laboratory Analysis, Sample Receipt. Shipment and receipt of samples is coordinated by the Monsanto or the outside laboratory to minimize time in transit.

A chain-of-custody form shall be prepared by the sampler for all samples that are submitted to outside laboratories.

Chain-of-Custody Procedures. The chain-of-custody procedure is designed to authenticate the transfer of environmental samples from Monsanto to an outside laboratory. In transferral of custody procedures, each custodian or sampler must sign, record, and date this transfer, using the form shown in Figure 1, or equivalent. A typical procedure is listed below.

CHAIN OF CUSTODY RECORD

PROJECT NUMBER	PROJECT NAME																
LABORATORY																	
STA. NO.	DATE	TIME	COMP	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS											REMARKS

SAMPLED BY AND TITLE *(SIGNATURE)*	DATE/TIME	RELINQUISHED BY: *(SIGNATURE)*	DATE/TIME	RECEIVED BY: *(SIGNATURE)*
RELINQUISHED BY: *(SIGNATURE)*	DATE/TIME	RECEIVED BY: *(SIGNATURE)*	RELINQUISHED BY: *(SIGNATURE)*	DATE/TIME	RECEIVED BY LAB: *(SIGNATURE)*

REMARKS _____

SAMPLE SHIPPED VIA
☐ UPS ☐ BUS
☐ FEDERAL EXPRESS

AIR BUS BILL NUMBER

DISTRIBUTION: WHITE — ORIGINAL ACCOMPANIES SHIPMENT, PINK — COPY TO COORDINATOR FIELD FILES, YELLOW — MONSANTO LAB

FORM 340

FIGURE 1

- Each sample will be assigned an identification number that will be listed on the chain-of-custody (COC) sheet, as well as logged into a record book.

- The COC form will be prepared by the sampler or the laboratory sample custodian. If the samples are going to an outside laboratory, the COC form must be accompanied by a scope of work which lists in detail the analysis required, the specific analytical method, the QA/QC program, and the type of report format. Also, both the COC form and scope of work should refer to a purchase order number along with a name and telephone number of the laboratory contact. A copy of the COC form will be retained for the laboratory file.

- The sample will be transported to the outside laboratory accompanied by the COC form and the scope of work. Lockable shipping containers or containers secured by seals will be used for shipping samples so that any evidence of tampering may be readily detected.

- The following procedures or their equivalents will be requested from all outside laboratories that analyze samples of regulated wastes.

a. The sample will be submitted to the laboratory sample custodian and assigned a control number.

b. The signatures of the persons relinquishing and obtaining custody of the sample will be required. For samples delivered by common carrier, receipts must be retained as part of the permanent COC documentation.

c. The sample custodian records in a logbook the date and time received, the amount of sample received, the source of sample, the method of transportation to the laboratory, conditions of sample received (e.g., sealed, unsealed, broken container), and all data from the sample label.

d. If the sample or a portion of it is transferred to another person for analysis, the amount released, the name of individual receiving the sample, and the date are recorded. The person receiving the sample assigns it an identification number and records all pertinent information in a logbook. Upon completion of analysis the sample will be returned to the custodian. The date of

return and the name of person returning the sample will be recorded.

e. Samples must be in a person's possession and in view or secured from the time of sampling until disposal.

f. The person responsible for the analysis must arrange for the proper disposal of the sample and its container.

g. The date and method of disposing of the sample are recorded by the custodian.

h. A copy of the completed COC form will be returned to Monsanto with the formal analytical report.

5.3 RECORDS RETENTION

All records applicable with RCRA and WAC 173-303 will be kept for a minimum of 3 years, unless specific requirements mandate records retention for a longer period of time.

6 OFFSITE FACILITY REQUIREMENTS

WAC 173-303-300(5) (e) and (g)

Monsanto manages only wastes generated at the Seattle plant. No regulated wastes generated offsite are accepted. Therefore, the waste analysis requirements for offsite facilities do not apply.

Appendix A
COMPATIBILITY INFORMATION

Appendix A

COMPATIBILITY INFORMATION

Presented in this appendix is a general synoptic analysis of the materials that potentially may be stored in the storage area and possible chemical incompatibilities that might arise if materials are mixed or spilled together. This analysis is general in nature and is adapted from the EPA guidance document, A Method for Determining the Compatibility of Hazardous Wastes (EPA-600/2-80-076, April 1980).

The potential chemical incompatibility information presented in the following worksheets is based on considering binary chemical reactions between chemical groups or reactivity classes of the principal constituents that may be found in the waste streams. The reaction codes indicated (e.g., heat generation, fire, and flammable gas production) are based solely on information presented in the document noted above. Monsanto has not conducted physical testing to confirm that the noted potential incompatibilities are, in fact, actual incompatibilities. Rather, the information is used by Monsanto to determine appropriate storage procedures in the storage area.

Worksheets are provided for the materials that may be stored in the storage area shown in Table A-1.

As appropriate, potential incompatibilities are noted on the worksheets. In the comment section are notes on the recommended storage procedures, based on consideration of the potential incompatibilities (for binary reactions).

SUMMARY

From the information tabulated in the attached worksheets, potential incompatibilities are possible in the event that drummed methylene chloride is inadvertently mixed or spilled together with the strainer solids stored in the tank. While the potential incompatibilities of heat generation and flammable gas generation are possible, this is considered a remote possibility since the wastes are stored in two separate sections of the storage area. There is a rollover berm separating the drum storage area from the rest of the storage area. Also, only one drum every 2 years of waste methylene chloride is estimated to be generated by the lab. Although the method predicts an incompatibility, since 1964 the routine daily mixing in the laboratory of these two materials has produced no problems.

Table A-1
POSSIBLE MATERIALS STORED IN STORAGE AREA

Material Description	Physical State	Area Stored[a]	Principal Contaminants/Concern	Reactivity Group Number[b]
Wastes				
Kingsolv	liquid	D	aliphatic petroleum distillate ethylene glycol monobutyl ether	28, 29 4, 14
Used Peneteck oil residue	viscous liquid	D	recycled oil still bottoms (phenols)	31
Methylene chloride	liquid	D	methylene chloride	17
Strainer solids	solid	T	corrosive (pH=11.4)	10
Product				
VSB	viscous solid	A	phenolics	31

[a] Shows the section of the storage area where the material is stored. All three sections are paved and drain to the same sump.
T = tank (RCRA Part A permitted)
D = drum storage area (RCRA Part A permitted)
A = adjacent storage area

[b] Refer to A Method for Determining the Compatibility of Hazardous Wastes, April 1980. EPA-600/2-80-076.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Strainer Solids — Source: Process Precipitate

Waste B: Used Penecteck Oil Residue — Source: Mineral Oil Clarification

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: Used Peneteck Oil Residue	WASTE B Reactivity Group No.: 31							
Strainer Solids	10	N								

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Methylene Chloride Source: Lab

Waste B: Used Peneteck Oil Residue Source: Mineral Oil Clarification

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: Used Peneteck Oil Residue							
		WASTE B Reactivity Group No.: 31							
Methylene Chloride	17	N							

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Methylene Chloride — Source: Lab

Waste B: Kingsolv — Source: Maintenance Shop

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: aliphatic petroleum distillate	aliphatic petroleum distillate	ethylene glycol monobutyl ether	ethylene glycol monobutyl ether				
		WASTE B Reactivity Group No.: 28	29	4	14				
Methylene Chloride	17	N	N	N	N				

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Kingsolv — Source: Maintenance Shop

Waste B: Used Peneteck Oil Residue — Source: Mineral Oil Clarification

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: Used Peneteck Oil Residue							
		WASTE B Reactivity Group No.: 31							
aliphatic petroleum distillate 28		N							
aliphatic petroleum distillate 29		N							
ethylene glycol monobutyl ether 4		N							
ethylene glycol monobutyl ether 14		N							

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Strainer Solids — Source: Process Precipitate

Waste B: Methylene Chloride — Source: Lab

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: Methylene Chloride							
		WASTE B Reactivity Group No.: 17							
Strainer Solids	10	GF[H]							

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: Not expected to be a serious problem because strainer solids are stored in the tank and drummed waste methylene chloride is stored in the drum storage area. However, it may be advisable to add additional secondary containment to the methylene chloride when it is stored (approximately one every 2 years) to avoid any potential spills mixing with the solids.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Waste A: Strainer Solids — Source: Process Precipitate

Waste B: Kingsolv — Source: Maintenance Shop

WASTE A Name	WASTE A Reactivity Group No.	WASTE B Name: Aliphatic petroleum distillate	Aliphatic petroleum distillate	Ethylene glycol monobutyl ether	Ethylene glycol monobutyl ether				
		28	29	4	14				
Strainer Solids	10	N	N	N	N				

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Product A: Vanillin Still Bottoms (VSB) Source: Heavy Fraction in Process

Waste B: Strainer Solids Source: Process Precipitate

PRODUCT A / WASTE B	Reactivity Group No.	Strainer Solids
Name	Reactivity Group No.	Name
VSB	31	N

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazerdous but Unknown
N	No Anticipated Consequences

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA · 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Product A: Vanillin Still Bottoms (VSB) Source: Heavy Fraction in Process

Waste B: Methylene Chloride Source: Lab

PRODUCT A / WASTE B	Name	Reactivity Group No.	Methylene Chloride							
			17							
VSB		31	N							

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA - 600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Product A: Vanillin Still Bottoms (VSB) — Source: Heavy Fraction in Process

Waste B: Used Peneteck Oil Residue — Source: Mineral Oil Clarification

PRODUCT A / WASTE B	Name	Reactivity Group No.	Used Peneteck Oil Residue							
			31							
VSB		31	N							

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA-600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

WORKSHEET FOR DETERMINING HAZARDOUS WASTE COMPATIBILITY

Product A: Vanillin Still Bottoms (VSB) Source: Heavy Fraction in Process

Waste B: Kingsolv Source: Maintenance Shop

PRODUCT A / WASTE B	Reactivity Group No.	28	29	4	14				
Name		aliphatic petroleum distillate	aliphatic petroleum distillate	ethylene glycol monobutyl ether	ethylene glycol monobutyl ether				
VSB	31	N	N	N	N				

H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerization
S	Solubilization of Toxic Substances
U	May be Hazardous but Unknown
N	No Anticipated Consequences

Note: Refer to *A Method for Determining the Compatibility of Hazardous Wastes*, April 1980, EPA-600/2-80-076, for instructions on completing this form.

Comments: No compatibility problems anticipated.

Example:

H
F
GT

Heat Generation, Fire, and Toxic Gas Generation

Appendix B
GUIDELINES FOR PROFICIENCY ENVIRONMENTAL TESTING PROGRAM

APG

Environmental Standards

Laboratory Solutions

Chemicals & Reagents

Analytical Products Group
P.O. Box 717
Marietta, OH 45750
800/272-4442
(614)/374-5499 in Ohio

APG

INSTRUCTIONS

Proficiency Environmental Testing Program

Analytical Products Group
P.O. Box 717
Marietta, OH 45750

Concentration Ranges

Standard	Units	Level 1	Level 2
DEMAND:			
Biochemical Oxygen Demand	mg/L	100-300	◄50
Chemical Oxygen Demand	mg/L	150-500	◄100
Total Organic Carbon	mg/L	50-200	◄30
NUTRIENTS:			
Ammonia Nitrogen as N	mg/L	◄1.0	1-5
Nitrate Nitrogen as N	mg/L	◄1.0	1-5
Orthophosphate as P	mg/L	◄0.5	◄1.0
Total Kjeldahl Nitrogen	mg/L	◄1.0	1-5
Total Phosphorus as P	mg/L	◄0.5	◄1.0
SOLIDS:			
Total Suspended Solids	mg/L	◄100	100-500
Total Dissolved Solids	mg/L	◄250	200-600
OIL & GREASE:	mg/L	◄20	20-50
MINERALS:			
Alkalinity as CaC03	mg/L	10-150	10-150
Calcium as Ca	mg/L	1-50	1-50
Chloride	mg/L	10-200	10-200
Conductivity	umho/cm	100-700	100-700
Magnesium	mg/L	◄20	◄20
Potassium	mg/L	1-100	1-100
Sodium	mg/L	5-75	5-75
Sulfate	mg/L	10-100	10-100
Total Hardness as CaC03	mg/L	10-150	10-150
pH:	units	2-10	2-10
TRACE METALS:			
Arsenic	ug/L	10-100	100-500
Barium	ug/L	200-1000	1000-2500
Cadmium	ug/L	10-100	100-300
Chromium	ug/L	20-100	100-300
Copper	ug/L	20-100	100-300
Iron	ug/L	20-200	200-800
Lead	ug/L	20-200	200-500
Manganese	ug/L	20-100	100-500
Mercury	ug/L	0.5-2.0	2.0-5.0
Nickel	ug/L	20-100	100-300
Selenium	ug/L	10-50	50-200
Silver	ug/L	10-100	100-400
Zinc	ug/L	10-100	100-250
PHENOL:	mg/L	◄0.5	◄5.0
CYANIDE:	mg/L	◄1.0	◄5.0
Total Residual Chlorine:	mg/L	◄1.0	1-10

INSTRUCTIONS

NOTE:

Every effort has been made to insure that your standards are received intact. Should you find a broken or leaking vial please contact APG immediately for a replacement.

DEMAND ANALYSES

Instructions:

The enclosed set of two (2) vials may be analyzed for BOD, COD, and TOC. The concentrates when diluted as directed below will give samples with known concentrations in the following ranges:

	Sample #1	Sample #2
BOD, mg/L	100-300	◄50
COD, mg/L	150-500	◄100
TOC, mg/L	50-200	◄30

Sample #1

Use a volumetric pipet to transfer 20ml of vial #1 to a one (1) Liter volumetric flask and dilute to volume with laboratory grade water.

Sample #2

Use a volumetric pipet to transfer 20ml of vial #2 to a one (1) Liter volumetric flask and dilute to volume with laboratory grade water.

NUTRIENT ANALYSES

Instructions:

The enclosed set of four (4) vials when properly diluted will give four samples with known concentrations. Vials 1 and 2 contain inorganic Nitrogen and Phosphorus compounds to be analyzed for Ammonia, Nitrate, and Orthophosphate. Vials 3 and 4 contain organic forms of Nitrogen and Phosphorus and may be analyzed for TKN Nitrogen and Total Phosphorus. The samples should not be filtered, but should be analyzed soon after dilution.

Sample Preparation:

Prepare four separate samples by diluting 10ml of each vial to 1 Liter with laboratory grade water. The resulting samples should be in the following ranges:

	Sample #1	Sample #2
Ammonia-N, mg/L	◄1.0	1-5
Nitrate-N, mg/L	◄1.0	1-5
Orthophosphate-P, mg/L	◄0.5	◄1.0
	Sample #3	**Sample #4**
TKN-Nitrogen, mg/L	◄1.0	1-5
Total Phosphorus, mg/L	◄0.5	◄1.0

SOLIDS

Instructions:
Each of the vials in the set has been carefully prepared to contain an exact amount of both suspended and total dissolved solids. The final samples will fall in the ranges shown below:

	Sample #1	Sample #2
Non-Filterable-TSS, mg/L	◄100	100-500
Total Filterable-TDS, mg/L	◄250	200-600

Sample Preparation:

Sample #1

Carefully transfer the contents of vial #1 into a one Liter volumetric flask; being sure to rinse both the cap and vial with multiple washings of laboratory grade water. Dilute the flask to volume with laboratory grade water.

Sample #2

Carefully transfer the contents of vial #2 into a one Liter volumetric flask; being sure to rinse both the cap and vial with multiple washing of laboratory grade water. Dilute the flask to volume with laboratory grade water.

NOTE:

1. Solids should be analyzed immediately after preparation.
2. Samples must be mixed vigorously before sampling for at least 30 seconds.
3. It is recommended that subsampling be done with a graduate cylinder. The graduate should be rinsed at least 3 times with laboratory grade water.

OIL AND GREASE SAMPLES

Instructions:
The enclosed set of two (2) vials contain known amounts of typical Oil and Greases. These samples when properly diluted will give results in the ranges shown below:

	Sample #1	Sample #2
Oil & Grease, mg/L	◄20	20-50

NOTE:
These standards are prepared in a solvent matrix and should not be analyzed by IR. A separate Standard for IR analysis is available upon request.

Sample Preparation:

Sample #1:

Pipet 10ml of vial #1 into a one (1) Liter volumetric flask and dilute to volume with laboratory grade water.

Sample #2:

Pipet 10ml of vial #2 into a one (1) Liter volumetric flask and dilute to volume with laboratory grade water.

RESIDUAL CHLORINE

The enclosed set of two (2) vials when properly diluted will provide two samples in the following ranges:

	Sample #1	Sample #2
Residual Chlorine, mg/L	◄1.0	1-10

Instructions:

Pipet 10ml of Level #1 Standard into a 1 Liter volumetric flask and dilute to the mark with laboratory grade water. Label as Sample #1. Repeat with Level #2 Standard.

MINERAL ANALYSES

Instructions:
The enclosed set of four (4) vials when properly diluted will give known concentrations in the ranges shown below.

NOTE:
Two separate samples are prepared from the four vials. Caution should be taken not to mix the contents of the vials.

Sample Preparation:

Sample #1

Add 900ml of laboratory grade water to a one Liter volumetric flask, pipet 10ml of vial #1 and 10ml of vial #2 into the flask. Mix well and dilute to the mark with laboratory grade water. Label as sample #1.

Sample #2

Add 900ml of laboratory grade water to a one Liter volumetric flask, pipet 10ml of vial #3 and 10ml of vial #4 into the flask. Mix well and dilute to the mark with laboratory grade water. Label as sample #2.

Parameter	Range
Alkalinity, mg/L	10-150
Calcium, mg/L	1-50
Chloride, mg/L	10-200
Conductivity, umho/cm	100-700
Magnesium, mg/L	◄20
Potassium, mg/L	1-100
Sodium, mg/L	5-75
Sulfate, mg/L	10-100
Total Hardness, mg/L as $CC0_3$	10-150

NOTE: The alkalinity reported should be corrected for a water blank.

pH ANALYSES

Instructions:
The enclosed set of two vials will give samples within the following ranges:

	Sample #1	Sample #2
pH, units	2-10	2-10

In order to prepare samples in the correct range, pipet 10ml of vial #1 into a 1 Liter volumetric flask and dilute to the mark with laboratory grade water and mix well. Label as sample #1. Repeat the same procedure for vial #2. Both samples should be analyzed immediately after the mixing.

CYANIDE ANALYSES

Instructions:
The enclosed set of two vials will give samples within the following ranges:

	Sample #1	Sample #2
Cyanide, mg/L	◄1.0	◄5.0

In order to prepare samples in the correct range, add two grams of Sodium Hydroxide and 900ml of laboratory grade water to a 1 Liter volumetric flask; then pipet 10ml of the indicated standard and dilute to the mark with water.

TRACE METAL ANALYSES

INSTRUCTIONS:

The enclosed set of two (2) vials may be analyzed for any or all of the metals listed below. The concentrates when properly diluted will give water samples with known concentrations of each metal in the ranges shown below.

Sample Preparation:

Each vial should be diluted as noted below with laboratory grade water or a natural water. If a natural water is used for dilution results should be corrected for background by analysis of an unspiked water blank.

Vial #1

Pipet 1.5ml of reagent grade Nitric Acid and 10.0ml of vial #1 into a 1 Liter volumetric flask and dilute to the mark with laboratory grade water.

Vial #2

Pipet 1.5ml of reagent grade Nitric Acid and 10.0ml of vial #2 into a 1 Liter volumetric flask and dilute to the mark with laboratory grade water.

Final Concentration Range in ug/Liter

Metal	Level #1	Level #2
Arsenic	10-100	100-500
Barium	200-1000	1000-2500
Cadmium	10-100	100-300
Chromium	20-100	100-300
Copper	20-100	100-300
Iron	20-200	200-800
Lead	20-200	200-500
Manganese	20-100	100-500
Mercury	0.5-2	2-5
Nickel	20-100	100-300
Selenium	10-50	50-200
Silver	10-100	100-400
Zinc	10-100	100-250

PHENOL ANALYSES

Instructions:

The set of two vials when properly diluted will give samples with known concentrations in the following ranges;

	Sample #1	Sample #2
Phenol, mg/L	◄0.5	◄5.0

Pipet 10ml of vial #1 into a 1 Liter volumetric flask and dilute to the mark with laboratory grade water. Label as Sample#1. Repeat the same procedure with vial #2. Label as Sample #2. Both samples should be analyzed immediately after dilution.

DATE REPORTING:

The P.E.T. program has been designed to allow you to compare your results with those of other participating laboratories. In order to insure comparability of results, please check the units for each parameter with the data reporting form. Your results should be returned on the enclosed reporting form.

NOTE:

All data is handled as proprietary information and will not be exchanged with other laboratories. Therefore, feel free to add additional information for your own internal use. Reports will include a transcription of your original data for verification. Each data form should be signed by the laboratory supervisor before submittal.

Questions, comments, or criticism of the program should be directed to:

Analytical Products Group, Inc.
P.O. Box 717
Marietta, OH 45750

(614)/374-5499

APG Analytical Products Group, Inc.

Q.C. Challenge

Proficiency Environmental Testing Program

Introduction:

The Proficiency Environmental Testing Program has been developed in cooperation with industry to allow laboratories to verify the quality of their environmental analyses. The P.E.T. Program permits you to *compare your laboratory results* against both the true values of a set of known standards and *against the results of all other participating laboratories.* This unique round-robin approach has been developed to allow peer review but with confidential data handling. All reports are coded and only summary data is exchanged to participating laboratories.

The standard sets listed are available immediately, and you may participate in as many or as few as you wish. The same sample sets are available with supplied reference values for use as external standards or spikes, if you do not wish to participate in the data analysis program.

Program Comparison:

The P.E.T. Program has been designed to provide standards which have the stability and reliability of the EPA Quality Assurance Standards and the low cost and easy accessibility of commercial standards. We encourage you to compare APG to your current source of standards.

MULTIPLE LEVELS: Each standard set includes standards at two levels, to provide confidence over a greater range.

CERTIFIED REFERENCE VALUE: APG Reference Values are the calculated theoretical true values. They are never adjusted to actual analysis values.

INTERLABORATORY COMPARISON: The P.E.T. Program allows comparison to:

1. Actual Means of Reporting Laboratories.
2. Actual Standard Deviations of Reporting Laboratories.
3. Your results as a deviation from the mean.
4. Average % Recovery.

Program Operation:

The standards you select will be supplied by the first of each month. Each set contains sample concentrates which will give the specified concentration ranges when properly diluted. The set also includes a data reporting form for submission of your results to APG. All data returned by the last day of the month will be included in the program report.

By the tenth of the following month you will receive a detailed report of how your laboratory's results compare to all others participating in the program. All data submitted to APG is regarded as confidential.

AVAILABILITY: Twelve unique standard sets are prepared each year. Requests for P.E.T. Participation are given immediate priority and standards are shipped the first of the following month. Requests for Reference Standards are shipped within seven days.

Concentration Ranges:

	Level I	Level II
DEMAND		
BOD	100-300	<50
COD	150-500	<100
TOC	50-200	<30
NUTRIENTS		
NH3-N	<1	<5
NO3-N	<1	<5
TKN	<1	<5
Ortho Phosphate	<0.5	<1
Total Phosphate	<0.5	<1
SOLIDS		
Total Suspended	<100	100-500
Total Dissolved	<250	200-600
MINERALS		
Hardness	10-150	
Calcium	1-50	
Magnesium	<20	
Sodium	5-75	
Potassium	1-100	
Sulfate	10-100	
Alkalinity	10-150	
Chloride	10-200	
Conductivity	100-700	
pH	5-10	

	Level I	Level II
OIL and GREASE		
Samples	<20	20-50
PHENOL		
Samples	<0.5	1-5
CYANIDE		
Samples	<1	1-5
TRACE METALS		
Arsenic	10-100	100-500
Barium	200-1000	1000-2500
Cadmium	10-100	100-300
Chromium	20-100	100-300
Copper	20-100	100-300
Iron	20-200	200-800
Lead	20-200	200-500
Manganese	20-100	100-500
Mercury	0.5-2	2-5
Nickel	20-100	100-300
Selenium	10-50	50-200
Silver	10-100	100-400
Zinc	10-100	100-250

NOTE: All concentration ranges are in mg/L except Trace Metals which are in ug/L.

Please inquire about discounts for multiple sets and monthly or quarterly programs.

NOTE: P.E.T. prices include full data analyses and report.
All sets include standards at two levels.

On your purchase order please indicate the number of standard sets you are requesting and to whom they should be mailed.

Q.C. Challenge

Standard	Unit Price
DEMAND	30.00
NUTRIENTS	25.00
SOLIDS	25.00
OIL & GREASE	25.00
MINERALS	50.00
TRACE METALS	85.00
FULL SET (ALL THE ABOVE)	200.00
CYANIDE	25.00
PHENOL	25.00

GOOD
QUALITY CONTROL
PAYS FOR ITSELF

ANALYTICAL PRODUCTS GROUP, INC.
P.O. Box 717, Marietta, OH 45750, (614) 374-5499